On the correlation between physicochemical properties of agar and its performance as edible coating and film to enhance shelf-life of fresh fruit [P3/04]

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Agar is a biopolymer extensively used as gel and stabilizer. Depending on red seaweeds and agar extraction protocols, different physicochemical properties are attained. This research aimed at a better understanding the agar's physicochemical properties effect on agar coatings performance to improve shelf-life of fresh fruits. Agar was extracted from red algae *Gracilaria vermiculophylla* in presence or absence of a pre-treatment with aqueous sodium hydroxide prior to extraction and purification. Agar extracts were characterized regarding molecular weight (Mw), sulphates, 3,6-anidrogalactoses (LA), gelation and melting point, extraction yield, gel strength, microstructure (via crio-SEM) and water content. Distinct agar-based coating and film formulations were prepared resorting to native and low sulphate and high anydrogalactose content-commercial agars. Glycerol and tween-80 were used as plasticizer and surfactant, respectively. Agar-based coatings were employed in fresh strawberries, which were further packed and stored at 10ºC, 80%RH and 25%van during 7-d, and shelf-life evaluated via several physicochemical, mechanical and nutritional parameters. Significant differences were observed in some properties, e.g. LA, sulphates, Mw, gel strength and microstructure – particularly in comparison to commercial agar. Coating data showed minor differences between native agar extracts and formulations but significant variations with commercial ones. Nevertheless, shelf-life improvement was apparent in coated fruits when analysing colour and phenolics. Commercial agar led to slightly stronger films but native agar produced appropriated ones. This study confirms high correlations between extraction procedure and some properties of final agar which, in turn, have some key effects when used as edible coatings and films. Finally, potential use of *G. vermiculophylla* agar in coatings and films was established, contributing to the valorisation of environmental by-products.

Keywords: Agar-based films and coatings, Gracilaria vermiculophylla, shelf-life of fresh fruit, physicochemical and mechanical properties

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